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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,205	02/26/2002	Taro Osabe	520.41287X00	4664

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EXAMINER

TRAN, THIEN F

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 12/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

NC

Office Action Summary

Application No.

10/082,205

Applicant(s)

OSABE ET AL.

Examiner

Thien F Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Objections

Claim 11 is objected to because of the following informalities: line 3, "substrate" should be --substrate;--. Appropriate correction is required.

Claim 17 is objected to because of the following informalities: line 3, "a drain" should be --a drain region--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Flagan et al. (USPN 6,586,785) in view of Sadd (USPN 6,400,610).

Flagan et al. discloses a semiconductor memory element (Fig. 11) comprising a source region 122 and a drain region 122 formed in an inherently semiconductor substrate 74; a channel region 120 formed in said semiconductor substrate between said source region and said drain region; a silicon oxide film 101 (151, 153 of Fig. 9) arranged on a portion of said semiconductor substrate corresponding to said channel region, wherein a plurality of silicon microcrystal grains 102 are formed in said silicon oxide film; and a gate electrode 132 formed over said silicon oxide film to control electric potential of said channel region, wherein a perimeter of each of said silicon microcrystal grains is covered with said silicon oxide film so that each of said microcrystal grains

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constitutes an independent and isolated charge storage region such that said plurality of said charge storage regions are electrically disconnected. Flagan et al. also discloses various conventional films suitable for use as gate electrode 132 may be used but does not explicitly disclose the gate electrode 132 formed of a metal or a semiconductor. It is conventional to use either metal or doped polysilicon (semiconductor) as suitable materials for the gate electrode 132 of Flagan et al. as shown for example by Sadd. Sadd discloses a gate electrode 204 formed of doped polysilicon or metal. Therefore, forming the gate electrode 132 of metal or doped polysilicon would have been obvious modification to have better conductivity for the gate electrode.

Regarding claims 12 and 20, an electric potential of +8V to be applied to said gate electrode upon writing of data (col. 15, lines 19-21) and an electric potential of +8V to be applied to said gate electrode upon erasing of data have the same polarity.

Regarding claims 13-14 and 19, said plurality of microcrystal grains 102 have a mean size of less than 15 nm or of 2-10 nm.

Regarding claims 15-16, said plurality of charge storage regions store charges from the same bit of data.

Regarding claim 17, Flagan et al. discloses said silicon oxide film 101 including core 102 and surrounding oxide 151, 153 together forming means for dispersing charges corresponding to one bit of data written into said semiconductor element into a plurality of independent isolated charge storage regions 102.

Regarding claim 18, said means for dispersing charges includes a plurality of silicon nanocrystals 102 (silicon microcrystal grains) formed in said silicon oxide film 101 which are electrically disconnected from one another.

Response to Arguments

Applicant's arguments with respect to claims 11-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Reference C is being cited since it shows silicon dot elements as floating gate.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thien F Tran whose telephone number is (703) 308-4108. The examiner can normally be reached on 8:30AM - 5:00PM Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on (703) 308-1690. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

tt
December 5, 2003


Thien F Tran
Primary Examiner